Measuring exposure to air pollution is crucial to understand its impact on health

Center for Study of Science, Technology and Policy
Jul 11, 2019 · 5 min read

Excerpts of an Interview with Dr Sreekanth Vakacherla

In order to improve air quality, we must first measure it: This is at the heart of Dr Sreekanth's work. As a Senior Research Scientist working with the Centre for Air Pollution Studies at CSTEP, Dr Sreekanth focuses on gathering evidence for air pollution in urban and rural areas of Bengaluru, through mobile measurement studies. He is setting up a reference-grade air quality monitoring station at CSTEP, which will both measure ambient air quality and evaluate low-cost sensors. Dr Sreekanth is most interested in areas such as air quality and atmospheric aerosol monitoring, aerosol remote sensing, and aerosol instrumentation.

1. **What is indoor air pollution and why is it important to measure it?**

Indoor air pollution is an important measure of personal exposure to air pollution and is an important link to understand how air pollution affects health. This is of serious concern especially in rural and peri-urban areas, where biomass cooking is a common practice and you'll find that indoor concentrations of particulate air pollutants are much higher. Most of these people spend 95% of their time indoors and so, indoor pollution contributes significantly to personal exposure. But this is an extremely understudied area. Ambient pollution is, in general, a measure of well-mixed pollutants in the atmosphere and is away from the source of pollution. However, indoor air pollutant concentrations can be higher (depending on the ventilation of the house) than that of the ambient air outside.

2. How can CPCB improve monitoring of air quality, especially in rural areas? Will low-cost sensors help?

Most of the reference grade pollution monitoring instruments by CPCB are placed in urban areas. Rural emissions and air pollution has been largely ignored and needs urgent attention. In rural areas, the number of measuring and monitoring equipment is inadequate. Low-cost sensors can help identify sources of pollution, in this regard. However, embracing low-cost sensors at this point could be challenging, considering they are still in the developmental phase and have their own limitations and sensitivities. There are a variety of low-cost sensors in the market but they need regular validations and calibration that are region-specific.

In both rural and urban areas, CPCB could consider disseminating quality-assured air pollution datasets as this will help the research and scientific community, who depend on public data, to find effective solutions.

3. MoEFCC's National Clean Air Program (NCAP) mentions "Rural Monitoring Network" (7.1.1(iv)). This is the first time that a national document is focusing on rural monitoring. In your opinion how robust is the government's plan to take up this initiative and what are the possible challenges?

India has approximately 0.75 billion rural biomass users (Census 2011), emitting more than 2 million tons of PM2.5, annually. Apart from using biomass for cooking, lighting, heating, etc., in rural areas, there is pollution from burning of household waste and agricultural residue; industries such as brick kilns, rice mills, and power plants. In this regard, air pollution monitoring in rural areas initiated by NCAP, is a welcome move.

However, measurements alone will not be enough. Considering the health impact of air pollution, I believe it is essential to raise awareness on the impacts of air pollution, especially indoor air pollution.

4. Can mobile measurement help in generating relevant data at city, state and national level? Do you think central and state pollution control boards should support such studies?

Mobile measurement of air pollution is relevant for exposure studies, especially in areas where large spatial variation in pollution levels are being observed. While these studies are expensive and cannot be used continually to measure air pollution, the data once generated can be used to build statistical models for predicting pollution levels.

It is important to remember, however, that mobile-measurement data cannot substitute reference-grade measurements. Considering the significant funding gap in procuring reference-grade equipment, governments can consider allocating more funds for this sector and building capacity within India to manufacture high quality reference-grade equipment.

5. Can you tell us a little about the Cardio-vascular Health effects of Air Pollution in Andhra, India (CHAI) project? What are the significant outcomes of the project that could help in changing the exposure studies landscape?

CHAI was funded by the European Research Council and investigates the relationship between particulate air pollution from outdoor and household sources with markers of atherosclerosis.

A total of 400 participants from rural areas in the Telengana region were given personal samplers to measure PM2.5 and Black Carbon, over a period of 24 hours in two seasons. These samplers were fitted with GPS to track where the persons were exposed to pollutants. It has provided important insights into the linkage between air pollution exposure and health. CHAI has the potential to make important methodological contributions to modelling air pollution exposure, integrating outdoor and household sources, as well as in the application of wearable camera data in environmental exposure assessments.

6. What are some of the projects you are involved in at CSTEP?

CSTEP recently launched the Centre for Air Pollution Studies (CAPS) and we have just set up an Air Pollution Lab to measure black carbon and PM2.5. We have also initiated a Mobile Measurement study for both rural and urban clusters of Bengaluru city. This is a nine month project being conducted in collaboration with University of Texas, University of Washington and ILK. The study will identify sources of pollution in these two clusters, which we hope will inform policy on the share of pollutants and specific mitigation measures that can be adopted to curb pollution levels as well as exposure. Most importantly, the study will help define protocols and methodology for conducting mobile measurement studies at large scales (regional or city level).

. . .

Join us at India Clean Air Summit 2019 (#ICAS19), a flagship event of the Center for Air Pollution Studies (CAPS) at CSTEP, to collaborate for solutions to Air Pollution in India. Register Now!

Environment Air Pollution Indoor Air Quality Health Rural